

“Differential blood pressure response to CPAP treatment according to the circadian pattern in hypertensive patients with obstructive sleep apnea”

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Only nondipper patients significantly benefited from CPAP treatment in terms of BP reduction. The study suggests that performing an ABPM before prescribing CPAP to hypertensive patients may be important in clinical practice to predict the blood pressure response.

Table S1. Changes in blood pressure at twelve weeks according to the circadian pattern

	Dipper		Nondipper	
	Sham N=62	CPAP N=51	Sham N=73	CPAP N=86
24h- ABPM				
Mean (mmHg)				
Baseline	95.9 (93.47 to 98.33)	98.51 (95.99 to 101.02)	99.62 (97.9 to 101.34)	98.5 (97.05 to 99.95)
3 months	95.24 (92.74 to 97.75)	97.41 (94.62 to 100.2)	99.36 (97.47 to 101.24)	95.38 (93.73 to 97.02)
Change	-0.66 (-2.13 to 0.81)	-1.1 (-2.78 to 0.57)	-0.26 (-1.61 to 1.08)	-3.12 (-4.53 to -1.71)
Systolic (mmHg)				
Baseline	127.65 (124.42 to 130.88)	130.67 (127.03 to 134.31)	130.83 (128.68 to 132.97)	130.84 (128.98 to 132.71)
3 months	126.51 (123.24 to 129.78)	128.9 (125.12 to 132.68)	130.48 (127.77 to 133.19)	126.6 (124.34 to 128.86)
Change	-1.14 (-3.01 to 0.73)	-1.77 (-4.23 to 0.69)	-0.35 (-2.08 to 1.38)	-4.24 (-6.31 to -2.17)
Diastolic (mmHg)				
Baseline	80.03 (77.78 to 82.27)	82.42 (80.21 to 84.64)	84.02 (82.25 to 85.79)	82.33 (80.77 to 83.88)
3 months	79.61 (77.08 to 82.13)	81.66 (79.08 to 84.24)	83.79 (82.1 to 85.49)	79.76 (78.08 to 81.45)
Change	-0.42 (-2.01 to 1.17)	-0.76 (-2.26 to 0.73)	-0.22 (-1.46 to 1.01)	-2.56 (-3.77 to -1.35)
Daytime- ABPM				
Mean (mmHg)				
Baseline	101.24 (98.71 to 103.77)	104.34 (101.66 to 107.02)	100.99 (99.29 to 102.69)	100.11 (98.61 to 101.61)
3 months	100.06 (97.28 to 102.84)	102.27 (99.42 to 105.13)	101.54 (99.71 to 103.37)	98.34 (96.54 to 100.15)
Change	-1.18 (-2.94 to 0.58)	-2.07 (-3.89 to -0.25)	0.55 (-0.8 to 1.89)	-1.76 (-3.32 to -0.21)
Systolic (mmHg)				
Baseline	133.76 (130.43 to 137.08)	137.57 (133.72 to 141.42)	132.4 (130.47 to 134.33)	132.49 (130.64 to 134.33)
3 months	131.98 (128.35 to 135.62)	134.75 (130.9 to 138.59)	132.7 (130.25 to 135.14)	129.9 (127.59 to 132.21)
Change	-1.77 (-3.95 to 0.4)	-2.82 (-5.43 to -0.22)	0.3 (-1.42 to 2.02)	-2.59 (-4.73 to -0.46)
Diastolic (mmHg)				
Baseline	84.98 (82.6 to 87.37)	87.73 (85.34 to 90.11)	85.29 (83.48 to 87.1)	83.92 (82.3 to 85.54)
3 months	84.1 (81.33 to 86.87)	86.04 (83.39 to 88.69)	85.96 (84.24 to 87.68)	82.57 (80.69 to 84.45)
Change	-0.89 (-2.75 to 0.97)	-1.69 (-3.32 to -0.05)	0.67 (-0.59 to 1.93)	-1.35 (-2.74 to 0.05)
Nighttime- ABPM				
Mean (mmHg)				
Baseline	85.22 (82.77 to 87.67)	86.84 (84.36 to 89.33)	96.88 (94.79 to 98.97)	95.28 (93.77 to 96.78)
3 months	85.61 (83.27 to 87.95)	87.67 (84.53 to 90.81)	94.99 (92.66 to 97.32)	89.44 (87.59 to 91.28)
Change	0.39 (-1.1 to 1.87)	0.83 (-1.41 to 3.07)	-1.89 (-3.73 to -0.05)	-5.84 (-7.63 to -4.06)
Systolic (mmHg)				
Baseline	115.44 (112.16 to 118.71)	116.88 (113.29 to 120.48)	127.68 (124.78 to 130.59)	127.56 (125.43 to 129.68)
3 months	115.56 (112.57 to 118.56)	117.22 (112.92 to 121.51)	126.04 (122.34 to 129.74)	120.01 (117.38 to 122.64)
Change	0.13 (-1.84 to 2.1)	0.33 (-3.01 to 3.68)	-1.64 (-4.17 to 0.89)	-7.55 (-10.12 to -4.97)
Diastolic (mmHg)				
Baseline	70.11 (67.89 to 72.33)	71.82 (69.65 to 74)	81.48 (79.36 to 83.6)	79.14 (77.59 to 80.69)
3 months	70.63 (68.25 to 73)	72.9 (70.06 to 75.74)	79.47 (77.49 to 81.44)	74.15 (72.39 to 75.91)
Change	0.52 (-1.05 to 2.08)	1.08 (-0.86 to 3.02)	-2.01 (-3.82 to -0.21)	-4.99 (-6.52 to -3.46)

Note: statistically significant p values (p values less than 0.05) are shown in bold. Abbreviations: ABPM=Ambulatory Blood Pressure Monitoring

Table S2. Changes in blood pressure by circadian pattern group

Blood Pressure	Dipper (Sham=62/CPAP=51)		Nondipper (Sham=73/CPAP=86)		Difference	
	<i>CPAP effect mean (95% CI)</i>	<i>p value</i>	<i>CPAP effect mean (95% CI)</i>	<i>p value</i>	<i>CPAP effect mean (95% CI)</i>	<i>p value</i>
24h- ABPM (mmHg)						
Mean	0·06 (-2·13 to 2·25)	0·9999	-3·08 (-4·91 to -1·24)	0·0064	-3·14 (-6·02 to -0·26)	0·0328
Systolic	-0·07 (-3·12 to 2·98)	1	-3·89 (-6·45 to -1·34)	0·0163	-3·83 (-7·82 to 0·17)	0·0606
Diastolic	0·07 (-1·97 to 2·11)	0·9999	-2·63 (-4·35 to -0·92)	0·0152	-2·71 (-5·4 to -0·02)	0·0486
Daytime- ABPM (mmHg)						
Mean	-0·25 (-2·66 to 2·16)	0·9969	-2·49 (-4·51 to -0·48)	0·0754	-2·24 (-5·4 to 0·93)	0·1648
Systolic	-0·28 (-3·49 to 2·93)	0·9982	-2·88 (-5·56 to -0·19)	0·1568	-2·6 (-6·8 to 1·61)	0·2257
Diastolic	-0·3 (-2·58 to 1·99)	0·9942	-2·27 (-4·19 to -0·35)	0·0959	-1·97 (-4·98 to 1·03)	0·1974
Nighttime- ABPM (mmHg)						
Mean	0·87 (-1·84 to 3·58)	0·9229	-4·37 (-6·66 to -2·09)	0·0012	-5·24 (-8·81 to -1·67)	0·0042
Systolic	0·55 (-3·33 to 4·44)	0·9923	-5·93 (-9·2 to -2·67)	0·0025	-6·49 (-11·58 to -1·39)	0·0128
Diastolic	1·04 (-1·44 to 3·52)	0·8447	-3·63 (-5·73 to -1·53)	0·0045	-4·67 (-7·94 to -1·39)	0·0054

Estimated CPAP effects using a linear model adjusted for baseline measurements. The model includes treatment, circadian pattern and their interaction. Statistically significant p values (p values less than 0·05) are shown in bold. Abbreviations: ABPM= Ambulatory Blood Pressure Monitoring; CPAP= Continuous Positive Airway Pressure.

eTable S3. CPAP effect on blood pressure according to the circadian pattern in true hypertensive subjects adjusted by confounding factors

Blood Pressure	Dipper (Sham=33/CPAP=43)		Nondipper (Sham =58/CPAP=62)		Difference	
	<i>CPAP effect mean (95% CI)</i>	<i>p value</i>	<i>CPAP effect mean (95% CI)</i>	<i>p value</i>	<i>CPAP effect mean (95% CI)</i>	<i>p value</i>
24h- ABPM (mmHg)						
Mean	0·01 (-2·86 to 2·88)	0·9999	-3·27 (-5·4 to -1·14)	0·016	-3·28 (-6·88 to 0·33)	0·0745
Systolic	0·78 (-3·17 to 4·72)	0·9804	-4·8 (-7·72 to -1·88)	0·0083	-5·58 (-10·54 to -0·62)	0·0277
Diastolic	-0·32 (-3·1 to 2·45)	0·9957	-2·52 (-4·58 to -0·46)	0·0821	-2·19 (-5·68 to 1·29)	0·2162
Daytime- ABPM (mmHg)						
Mean	-0·98 (-4·13 to 2·17)	0·9294	-2·7 (-5·04 to -0·36)	0·1115	-1·72 (-5·68 to 2·24)	0·3924
Systolic	-0·32 (-4·45 to 3·8)	0·9987	-3·72 (-6·79 to -0·66)	0·0841	-3·4 (-8·59 to 1·79)	0·1977
Diastolic	-1·3 (-4·4 to 1·8)	0·8445	-2·19 (-4·49 to 0·11)	0·2459	-0·89 (-4·79 to 3)	0·6516
Nighttime - ABPM (mmHg)						
Mean	1·8 (-1·7 to 5·31)	0·7441	-4·55 (-7·15 to -1·95)	0·0042	-6·35 (-10·74 to -1·97)	0·0048
Systolic	2·61 (-2·57 to 7·79)	0·7572	-6·92 (-10·75 to -3·09)	0·0028	-9·53 (-16·02 to -3·04)	0·0042
Diastolic	1·44 (-1·78 to 4·66)	0·8164	-3·51 (-5·91 to -1·1)	0·0242	-4·95 (-8·99 to -0·91)	0·0167

Estimated CPAP effects using a linear model adjusted for baseline measurements, age, sex, BMI, and AHI. The model includes treatment, circadian pattern and their interaction. Statistically significant p values (p values less than 0.05) are shown in bold. Abbreviations: ABPM= Ambulatory Blood Pressure Monitoring; CPAP= Continuous Positive Airway Pressure

